UTAH GEOLOGICAL SURVEY
a division of
UTAH DEPARTMENT OF NATURAL RESOURCES

Plate 1
Utah Geological Survey Miscellaneous Publication MP-99-5
Geologic Map of the Keg Mtn. Ranch Quadrangle

(TABLE MOUNTAIN) 3463 IV NW
(INDIAN SPRINGS) 3463 I NW
3463 IV NE (COYOTE SPRINGS)
SIMPSON SPRINGS 15 MI.
(THE HOGBACK) 3463 III NE
(PICTURE ROCK HILLS) 3463 III NW
(CRATER BENCH RESERVOIR) 3463 II NW
3463 IV SW (KEG PASS)
3463 I SW (ERICKSON WASH SW)

Base map from U.S. Geological Survey
Keg Mtn. Ranch 7.5' Quadrangle, 1971

SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

14.1°
251 MILS
1999 MAGNETIC DECLINATION
AT CENTER OF SHEET

UTAH
QUADRANGLE LOCATION

The Miscellaneous Publication Maps provide an outlet for authors who are not Utah Geological Survey staff. Not all aspects of this publication have been reviewed by the UGS.

GEOLOGIC MAP OF THE KEG MTN. RANCH QUADRANGLE, JUAB COUNTY, UTAH

by

Michael A. Shubat, Tracey J. Felger and Jon K. King

1999

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1999

UTAH GEOLOGICAL SURVEY
a division of the
UTAH DEPARTMENT OF NATURAL RESOURCES

Plate 2
Utah Geological Survey Miscellaneous Publication 99-5
Geologic Map of the Keg Mtn. Ranch Quadrangle

DESCRIPTION OF GEOLOGIC UNITS

Qal — Stream alluvium (Holocene and latest Pleistocene) - Unconsolidated, poorly sorted clay, silt, sand, and gravel, to boulder size, in modern stream channels in upland areas, and calcareous clay, silt, and sand in the Old River Bed; generally less than 15 feet (<5 m) thick in upland areas and 20 to 50 feet (6 to 15 m) thick in Old River Bed.

Qafy — Post-Bonneville alluvial-fan deposits (Holocene and latest Pleistocene) - Mapped where unit Qaf_2 cannot be separated from Qaf_2 on southeast flank of Keg Mountain; equivalent to mostly Holocene alluvial fans in adjacent quadrangles (units Qaf_1 of Shubat and Christenson, 1999; Shubat, 1999; Oviatt and others, 1994a); less than 50 feet (15 m) thick.

Qaf_1 — Younger post-Bonneville alluvial-fan deposits (Holocene) - Poorly sorted, clay, silt, sand, and gravel in active fans; many only contain fine-grained, reworked lacustrine sediments; locally include and are gradational into stream alluvium (Qal); less than 50 feet (15 m) thick.

Qaf_2 — Older post-Bonneville alluvial-fan deposits (Holocene and latest Pleistocene) - Poorly sorted silt, sand, and gravel, to cobble size, in fans that are inactive and undergoing erosion; some contain finer grained, reworked lacustrine sediments; less than 50 feet (15 m) thick.

Qaf_3 — Lake Bonneville-age alluvial-fan deposits (latest Pleistocene) - Poorly sorted sand and gravel, to boulder size, in a fan-shaped deposit that overlies and is incised into lacustrine deposits above the Provo shoreline in the northeast corner of the quadrangle; fan toe is truncated by the Provo shoreline; estimated thickness less than 100 feet (30 m).

Qdf — Fine-grained deltaic deposits (latest Pleistocene) - Laminated to very thick-bedded, calcareous clay, silt, and fine sand; only exposed on the north margin of the map; part of the latest Pleistocene delta (underflow fan) of the overflow from the lake in the Sevier Desert basin into Lake Bonneville; up to at least 10 feet (3 m) thick.

Qls — Lacustrine gravelly sand (latest Pleistocene) - Well-sorted to very poorly sorted sand and pebbly sand; presently being modified by alluvial and eolian activity; thickness variable but less than 20 feet (6 m).

Qlk — Lacustrine carbonate sand (latest Pleistocene) - Fine- to medium-grained, calcareous sand with rounded, coarse sand- to granule-sized clasts, carbonate pellets, and carbonate-coated gastropods; locally reworked by alluvial and eolian activity; less than 15 feet (5 m) thick.

Qlm — Lacustrine marl (latest Pleistocene) - White to gray, very thin-bedded to indistinctly laminated, fine-grained, highly calcareous sediment containing abundant ostracodes; locally contains abundant gastropods and clastic-rich marl at the base and top of the unit; Pahvant Butte ash (15,500 years old) locally present near the top of the unit; 6 to 30 feet (2 to 10 m) thick.

Qlg — Lacustrine gravel (latest Pleistocene) - Well-sorted sandy gravel and gravel, mostly composed of locally derived, rounded clasts of bedrock and pre-Lake Bonneville alluvial fans; deposited as bars, spits and beaches; thickness variable, but generally less than 20 feet (6 m).

Qac — Alluvium and colluvium (Holocene and latest, and possibly middle, Pleistocene) - Locally derived, angular to sub-angular, clay, silt, sand, and gravel, to boulder size, in fan and stream alluvium, and in colluvium in upland valleys and next to drainages; less than about 30 feet (9 m) thick.

Qla — Undivided lacustrine and alluvial deposits (Holocene and late, and possibly middle, Pleistocene) - Clay- to boulder-sized deposits that consist of pre-Lake Bonneville alluvial fans partially reworked in the lake, more or less in place; Lake Bonneville deposits partially reworked by post-Bonneville alluvial activity; and areas where contacts between thin lacustrine and alluvial deposits could not be mapped; probably less than 10 feet (3 m) thick.

Qaf_4 — Pre-Lake Bonneville alluvial-fan deposits (middle[?] and late Pleistocene) - Poorly sorted, mostly coarse-grained, clay, silt, sand, and gravel, to boulder size, in fans above the Bonneville shoreline in piedmont areas; fan surfaces are less dissected than the oldest alluvial fans (QTaf); exposed thickness at least 10 feet (3 m).

QTaf — Quaternary and Tertiary(?) alluvial-fan deposits (early and middle[?] Pleistocene and Pliocene[?]) - Unconsolidated to semi-consolidated, poorly sorted, mostly coarse-grained clay, silt, sand, and gravel, to boulder size, in fans on the north flank of Keg Mountain above the Bonneville shoreline; eroded into whalebacks; several hundreds of feet (30 to 90 m) thick.

Ttm — Topaz Mountain Rhyolite (Miocene) - Divided into:

Rhyolite flows, domes, and intrusions - White, gray, and purplish rhyolite containing sparse (10 to 15 percent), small (0.08 inch [2 mm]) phenocrysts of quartz and sanidine, and lesser plagioclase, biotite, and opaque mineral phenocrysts in a matrix of devitrified glass; black to brown vitrophyre at base of some flows and domes; dated at 6.3±0.1 Ma (average) in the Thomas Range by Lindsey (1982); less than about 7 million years old here; maximum exposed thickness 1,000 feet (300 m).

Ttmt — Stratified tuff - Pale-tan to orange, very thick- to thin-bedded, nonwelded to fused, lithic-rich, rhyolitic tuff and volcanic sandstone; contains a variety of volcanic rock fragments, abundant pumice clasts, and sparse crystal fragments in an ash matrix; occurs as discontinuous volcaniclastic lenses beneath many Topaz Rhyolite flows and domes; extensively argillized, zeolitized, and feldspathically altered; thickness 0 to 280 feet (85 m).

Tkm — Rhyolite of Keg Mountain (Miocene) - Divided into:

Rhyolite flows, domes and intrusions - Gray to dark-purple rhyolite containing abundant, large (0.4 inch [10 mm]) phenocrysts of plagioclase, and lesser amounts of sanidine, quartz, biotite, and opaque mineral phenocrysts in a matrix of devitrified glass; black vitrophyre at the base of some flows and domes; dated at 6.7±0.3 and 6.9±0.3 Ma by Plavidal (1987); maximum exposed thickness 2,000 feet (610 m).

Tkmt — Stratified tuff - Pale-tan to orange, very thick- to thin-bedded, nonwelded to fused, lithic-rich, rhyolitic tuff and volcanic sandstone, with lapilli and block tuff beds; contains abundant pumice clasts, volcanic rock fragments, and sparse crystal fragments in an ash matrix; occurs as discontinuous volcaniclastic lenses beneath many flows and domes; extensively argillized, zeolitized, and feldspathically altered; thickness 0 to 300 feet (0 to 90 m).

Td — Dell Tuff (Oligocene) - Pink to tan, poorly to moderately welded, crystal-rich, rhyolitic ash-flow tuff; contains abundant, 0.08- to 0. 4-inch (2- to 10-mm) phenocrysts of quartz, sanidine, plagioclase, and biotite; contains up to 19 percent volcanic rock fragments; dated at 32.0±0.6 Ma (average) by Lindsey (1982); maximum exposed thickness 600 feet (180 m), the thickest at Keg Mountain.

Trp — Rhyolite porphyry (Oligocene) - Small, pale-gray to pink, light-tan weathering dikes and plugs with large (up to 0.4 inch [1 cm]) phenocrysts of sanidine, quartz, plagioclase, and biotite in an aphanitic matrix; phenocrysts nearly absent (aphyric) near the margins of intrusions and become more abundant toward the interior; dated by Shubat and Snee (1992) at 35.14±0.15 Ma.

Tj — Joy Tuff (Oligocene) - Red-brown to pink, moderately to densely welded, rhyolitic ash-flow tuff; black vitrophyre at base which is overlain by black flamme-rich zone; contains abundant, 0.04 to 0.31 inch (1 to 8 mm) phenocrysts of quartz, sanidine, plagioclase, and biotite, and up to 14 percent lithic clasts of volcanic, intrusive and sedimentary rocks; dated by Shubat and Snee (1992) at 34.88±0.06 Ma; exposed thickness 80 feet (24 m).

Tpd — Pebble dikes (Oligocene and Eocene) - Small (200 foot [60 m] diameter) dikes or pipes containing argillized and iron-stained clasts of Tertiary volcanic and intrusive rocks, and Paleozoic sedimentary rocks; matrix poorly exposed; only present on central west margin of map; not dated, but younger than Mt. Laird Tuff.

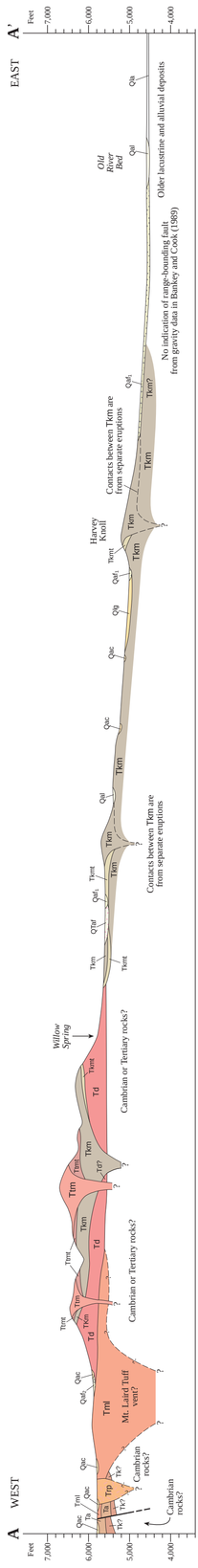
Tml — Mt. Laird Tuff (Oligocene and Eocene) - Lavender, pale-green, dark-green, and brown, moderately welded, dacitic ash-flow tuff, tuff-breccia, lapilli-tuff, and probable lava flows and hypabyssal intrusions; characterized by abundant, 0.08- to 0.47-inch (2- to 12-mm) phenocrysts of white plagioclase; other phenocrysts are hornblende, biotite, quartz, and clinopyroxene; minor facies is accretionary lapilli-block tuff with a black, aphyric matrix; dated by Shubat and Snee (1992) at 36.54±0.06 Ma; maximum exposed thickness 240 feet (73 m).

Tk — Keg Tuff (Oligocene and Eocene) - Dark-red-brown to black, densely welded, moderately crystal-rich, dacitic ash-flow tuff; black vitrophyre locally present at base; abundant, bronze-weathering biotite prominent on surfaces parallel to layering; also contains plagioclase, biotite, quartz, and hornblende phenocrysts; dated by Shubat and Snee (1992) at 36.77±0.12 Ma; maximum exposed thickness 200 feet (60 m; 540 feet [165 m] thick in the Keg Pass quadrangle).

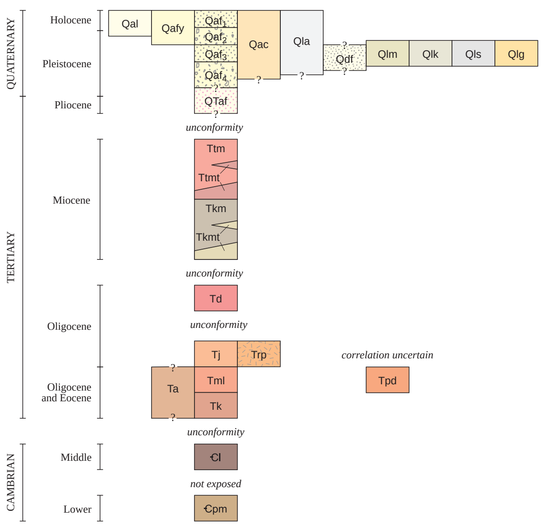
Ta — Andesite of Keg Pass (Oligocene and Eocene) - Heterogeneous, dark-colored, dacitic, latitic, and andesitic flows and lesser lahars; flows contain phenocrysts of andesine, biotite, hornblende, quartz, clinopyroxene, and magnetite in a trachytic matrix; some flows contain plagioclase crystals as long as 0.6 inches (15 mm); lahars contain clasts of andesite, quartzite, limestone, and, locally, Mt. Laird Tuff; propylitic alteration common; age variable but as old as 39 and as young as 37 million years; maximum exposed thickness about 200 feet (60 m).

Cl — Undifferentiated Cambrian carbonate rocks (Middle Cambrian) - Light- to dark-gray, medium- to thick-bedded, biosparite limestone in isolated exposures; correlation uncertain, but probably part of the Howell Limestone, Chisholm Formation, Dome Limestone, Whirlwind Formation, or Swasey Limestone; exposed thickness less than 20 feet (6 m) thick, but up to 200 feet (60 m) thick in Keg Pass quadrangle.

Cpm — Prospect Mountain Quartzite (Cambrian) - Pinkish-gray to tan, rusty-weathering, medium-grained, thick-bedded quartzite with small-scale cross-bedding; pervasively brecciated in most exposures; exposed thickness 80 feet (24 m), but more than 820 feet (250 m) thick to north in Slow Elk Hills.



CORRELATION OF GEOLOGIC UNITS



STRATIGRAPHIC COLUMN

SYSTEM	SERIES	FORMATION / MAP UNIT	SYMBOL	THICKNESS Feet (Meters)	LITHOLOGY
QUATERNARY		Quaternary deposits	Q	0-100 (0-30)	
?	?	Quaternary and Tertiary(?) alluvial-fan deposits	QTaf	~0-300 (~0-90)	
TERTIARY	Pliocene ?				unconformity
	Miocene	Topaz Mountain Rhyolite: Rhyolite flows, domes, and intrusions	Ttm	0-1,000 (0-300)	Ttmt
		Topaz Mountain Rhyolite: Stratified tuff	Ttmt	0-280 (0-85)	
		Rhyolite of Keg Mountain: Rhyolite flows, domes, and intrusions	Tkm	0-2,000 (0-610)	Tkmt
		Rhyolite of Keg Mountain: Stratified tuff	Tkmt	0-300 (0-90)	
	Oligocene	Dell Tuff	Td	0-600 (0-180)	unconformity ~32-34 Ma
	Oligocene and Eocene?	Joy Tuff	Tj	0-80 (0-20)	unconformity Avg. 34.88 ± 0.6 Ma
		Mt. Laird Tuff	Tml	0-240 (0-73)	Avg. 36.54 ± 0.6 Ma ~37-40 Ma, but see correlation chart for probable stratigraphic relationships
		Andesite of Keg Pass	Ta	0-200 (0-60)	
		Keg Tuff	Tk	0-200+ (0-60+)	36.77 ± 0.12 Ma Ar-Ar unconformity
	Middle	Undiff. carbonate rocks	Cl	20+ (6+)	
CAMBRIAN	Lower	Prospect Mountain Quartzite	Cpm	80+ (24+)	

MAP AND CROSS SECTION SYMBOLS

- Contact - dashed where approximately located; querried on cross section where diagrammatic
- High-angle fault - dashed where location inferred; dotted where covered, bar and ball on downthrown side, dip indicated where measured; dashed and queried where diagrammatic; arrows show relative direction of movement on cross section
- Air-photo lineament - probable location of fault
- Bonneville shoreline
- Provo shoreline
- 70 — Strike and dip of bedding
- vertical / 25 — Strike and dip of layering in volcanic rocks
- KP-6-5 △ — Location of sample analyzed in this study (results in table 1 and appendices)
- BFC — Location of Bonneville flood contact exposure
- KMO — Location of type area of Keg Mountain oscillation
- PB — Location of Pahvant Butte ash exposure
- A A' — Line of cross section